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# POSSIBLE CANCER HAZARD PRESENTED BY FEEDING DIETHYLSTILBESTROL TO CATTLE

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The introduction of the powerful drug, diethylstilbestrol, into the nation's food supply prompts consideration of the actions of this compound. It is known to induce cancer. It has also been found to stimulate weight gain. For the latter reason, there has developed a practise of administering this drug to poultry and beef cattle in the United States.

It has been estimated that more than 30,000,000 chickens per year are inoculated with pellets of diethylstilbestrol, and that approximately half of the beef cattle in the country are now given feeds to which this drug has been added. In the case of poultry, the pellets are intended to be inserted at the base of the skull on the supposition that this part will be discarded and not eaten. But among nine lots of poultry coming into the New York market and examined by inspectors of the Food and Drug Administration, about 35% of the birds were stated to contain such pellets in the neck.

Similar findings emerged from subsequent investigations, and the residual diethylstilbestrol was reported as 3 to 24 milligrams per bird. It has been claimed that no appreciable quantities of diethylstilbeetrol can be demonstrated in the tissues of cattle fed this drug, but this claim may convey a false sense of security for reasons subsequently indicated in this presentation.

It may be noted that diethylstilbestrol is not destroyed by temperatures far exceeding those employed in cooking. It can be manufactured at a temperature of 428 degrees F. The temperature recommended for roasting chickens is 350 degrees F. Temperatures of 140 to 180 degrees F. are found in the interior of roasts of beef.

It thus seems pertinent to review toxicological data. Administration of estrogens, among which diethylstilbestrol is one of the most potent, has led to a wide range of pathological changes in human beings and in animals. In mice, rats or guinea pigs, estrogens can induce polyps, fibroids and cancers of the uterus, cancers of the cervix, cancers of the breast, hyperplasia of prostatic stroma and of endometrium, tumors of the testicle and hypophysis, and lymphosarcomas. In the experience of one of us (R.I.), uterine tumors have frequently been found in guinea pigs given as little as 1.5 milligrams of this or other estrogens in subcutaneously implanted pellets. Such a pellet, removed from an animal one year after implantation, was found to retain sufficient activity to induce a tumor upon reimplantation into another animal. The effective dose thus approaches the infinitesimal.

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Claims that no appreciable quantities of diethylstilbestrol can be demonstrated in the tissues of cattle fed this drug must therefore be carefully scrutinized, both as to the sensitivity and accuracy of the test methods and also the tissue selected for study. For example, diethylstilbestrol is soluble in fats and would not be expected in samples selected from lean meat. An even more cogent consideration is the fact that the fundamental mechanism of cancer induction is not understood. Many tumors are known to be caused by viruses. In mice, cancer of the breast has been traced to a virus. But for its tumor-producing activity this virus is dependant upon stimulation by estrogens, such as diethylstilbestrol. The virus remains in the tissues and exerts its neoplastic effects long after cessation of administration of estrogens. The absence of detectable estrogen in the tissues of animals treated with or fed such a substance thus offers no assurance of the absence of a cancer hazard in such tissues.

The latter point merits the more consideration, for a great body of evidence shows that cancer-inciting chemicals can exert their effects in catalytic quantities, inducing changes in cells which are mediated by unknown substances transmitted from cell to cell long after the original cancer-inciting material ceases to be demonstrable in the tissues. No assurance of the absence of such substances can be offered consumers of tissues from animals treated with or fed a carcinogen, such as diethylstilbestrol.

In human beings, a variety of pathological changes have been found to follow administration of estrogens to women. There is evidence for stimulation of the growth of certain previously existing tumors, but claims for primary initiation of cancer in women by estrogens have been few in contrast to the great number and diversity of tumors following estrogenic treatment of animals. In women, estrogens have usually been administered by intermittent injections. In animals, it has been found that the spacing of such injections greatly influences the yield of tumors. Most important, it has been learned from animal work that intermittent injection of very large doses of estrogens is far less effective in inducing tumors than is a continuing exposure to an extremely minute dose. This phenomenon has been repeatedly observed by one of us (R.I.) in experiments conducted over a period of nearly twenty years. It is a continuing exposure to extremely minute doses that is to be feared from the introduction of estrogens into the food supply.

A further consideration lies in the long period of time that elapses between first exposure to a carcinogen, such as diethylstilbestrol, and eventual appearance of a tumor.

In animal experiments, exposure is customarily begun early in life and the majority of tumors arise when the animals are old. Experience in the results of administration of estrogens to human beings has been largely limited to treatment of conditions arising fairly late in life. By comparison, the majority of human beings thus far exposed would complete their life span before the passage of sufficient time to observe a carcinogenic effect of estrogens. The introduction of estrogens into the food supply, however, presents the problem of exposure of human beings from birth onward. That human beings are not immune to the cancer-inciting action of estrogens is shown by the fact that there are on record some 17 cases of cancer of the breast in men given estrogens, including diethylstilbestrol, for treatment of prostate cancer.

It need hardly be said that cancer has assumed epidemic proportions in the United States. Addition to the cycle of food supply of any substance known to aggravate or initiate this disease places a grave responsibility upon advocates of such a practice.